2M06-MLEM-PM-03
10 August 2005

Directorate of Metrology
Purchase Description

Automated Mass Comparator Environmental Upgrade

1.0 Scope:

This purchase description specifies an upgrade to the Mettler-Toledo AX64004 Automated Mass Comparator which is used in the calibration of mass standards. The upgrade will measure temperature, humidity and barometric pressure at the measurement site and apply this data to the individual measurements. Any item satisfying the salient characteristics listed below will be acceptable.

2.0 Salient Characteristics:

The Automated Mass Comparator Environmental Upgrade will incorporate the following characteristics, which are essential to the government.

2.1 Air Temperature:

2.1.1 Temperature Measurement Range: The Automated Mass Comparator Environmental Upgrade will be capable of measuring air temperature over a range from 15 to 25 degrees Celsius minimum.

2.1.2 Temperature Measurement Resolution: The air temperature measured by the Automated Mass Comparator Environmental Upgrade will be readable to 0.001 degrees Celsius over the measurement range.

2.1.3 Temperature Accuracy: The accuracy of the air temperature measurement shall be +/- 0.05 degrees Celsius or better.

2.2 Dewpoint:

2.2.1 Dewpoint Measurement Range: The Automated Mass Comparator Environmental Upgrade will be capable of measuring dewpoint temperature over a range from 0 to 17 degrees Celsius at a minimum.

2.2.2 Dewpoint Measurement Resolution: The Automated Mass Comparator Environmental Upgrade measurement of Dewpoint shall be readable to at least 0.001 degrees Celsius.

2.2.3 Dewpoint Measurement Accuracy: The accuracy of the dewpoint measurement shall be at least +/- 0.05 degrees Celsius.

2.3 Relative Humidity:

The Automated Mass Comparator Environmental Upgrade shall be capable of calculating the relative humidity from the air temperature and the dewpoint to a resolution of 0.01 % RH.

2.4 Air Pressure:

2.4.1 Air Pressure Measurement Range: The Automated Mass Comparator Environmental Upgrade will be capable of measuring air pressure over a range from 600 to 1100 hPa (hecto Pascals) minimum.

2.4.2 Air Pressure Measurement Resolution: The Automated Mass Comparator Environmental Upgrade measurement of Air Pressure shall be readable to 0.001 hPa or better.

2.4.3 Air Pressure Measurement Accuracy: The accuracy of the air pressure measurement shall be +/- 0.05 hPa or better.

2.5 Sensors: The sensors must be interchangeable with other sensors and capable of being removed and calibrated locally. Each sensor shall have a minimum of 6 feet of cable to allow for moving the sensor to a specific workstation, if needed.

2.5.1 Extra Sensors: The Automated Mass Comparator Environmental Upgrade will include an extra set of sensors so that the Automated Mass Comparator can remain fully functional while a set of sensors is sent out for calibration.

2.6 System Compatability:

The Automated Mass Comparator Environmental Upgrade will be compatible with the hardware and the software associated with the Mettler-Toledo AX 64004 Automated Mass Comparator. The system will be capable of measuring and recording the environmental data as the measurements are made and supplying the AX 64004 system with the data to calculate the air densities and the air buoyancy corrections.

2.7 Power:

The Automated Mass Comparator Environmental Upgrade will be capable of operating on standard 110 V AC 60 Hz. electrical power.

2.8 Mechanical and Physical Requirements:

2.8.1 Commercial Parts:

Commercial parts and materials that are used shall have properties consistent with a precision laboratory instrument.

2.8.2 Design and Construction:

The equipment shall be designed and constructed of materials that meet the requirements of this specification and in accordance with the best commercial practices for industry approved equipment. It shall be designed and manufactured to maximize reliability, maintainability, accuracy of operation, and ease of operation. All parts such as shafts, bearings, regulators, switches, controls, etc ..., shall have proper clearance and adjustments. They shall work together so that the equipment will supply the rated requirements without unnecessary strains, vibrations or overheating. They shall be able to withstand the conditions met in shipping, storage, installation and service. All materials and parts of this equipment shall be capable of withstanding the environmental requirements of this specification.

2.8.3 Selected Components:

Matched and selected components shall be kept to an absolute minimum. Use of specially built, nonstandard components shall be avoided.

3.0 Safety:

Documentation will be provided to support the means by which electrical safety considerations have been addressed. The safety of all personnel will be assured personnel conductive or nonconductive contact with the outside of the equipment, and during the changing of the fuse with the power to the system and it's

components on. This documentation shall consist of a minimum of a citing of a UL or ANSI identified standard or equivalent United States Std that the equipment conforms to.

4.0 Testing:

This item will be inspected and accepted at destination. The item will be checked with test equipment with parameters equal to or better than those required to assure that specified performance parameters are met. Test equipment used shall have first echelon certification directly traceable to the National Institute of Standards Technology (NIST) where required. Tests will be performed to assure that the item meets the requirements of paragraphs 2.1 through 2.8 of this purchase description. Such testing at destination does not relieve the contractor of performing all inspections and quality checks at the point of manufacture as necessary to assure performance as specified herein.

5.0 Installation:

The contractor shall be responsible for setting up the system on site to assure the system is fully functional and meets the requirements of this purchase description.

6.0 Training:

The contractor will provide at least one 8 hour training day, (excluding travel time), for training AFPSL personnel in at least the following areas:

A. Calibration procedures
B. Adjustment procedures
C. Location of components
D. Equipment required for adjustments
E. Troubleshooting procedures

1. Attachments: Data Requirements

Attachment to
Purchase Description 2M06-MLEM-PM-03
Automated Mass Comparator Environmental Upgrade

Data Requirements

MANUALS: A complete user and service manual and calibration procedure shall be provided with each unit in contractor format. Manuals shall be on CD-ROM in Indexed Portable Document Format (iPDF). The manuals shall comply with Data Item Description (DID) DI-TMSS-80527A and the Contract Data Requirements List (DD Form 1423.